

LA  
927  
W754r  
1949

Wilson

Research Needed in Field of  
Sanitation



UA 927 qW754r 1949

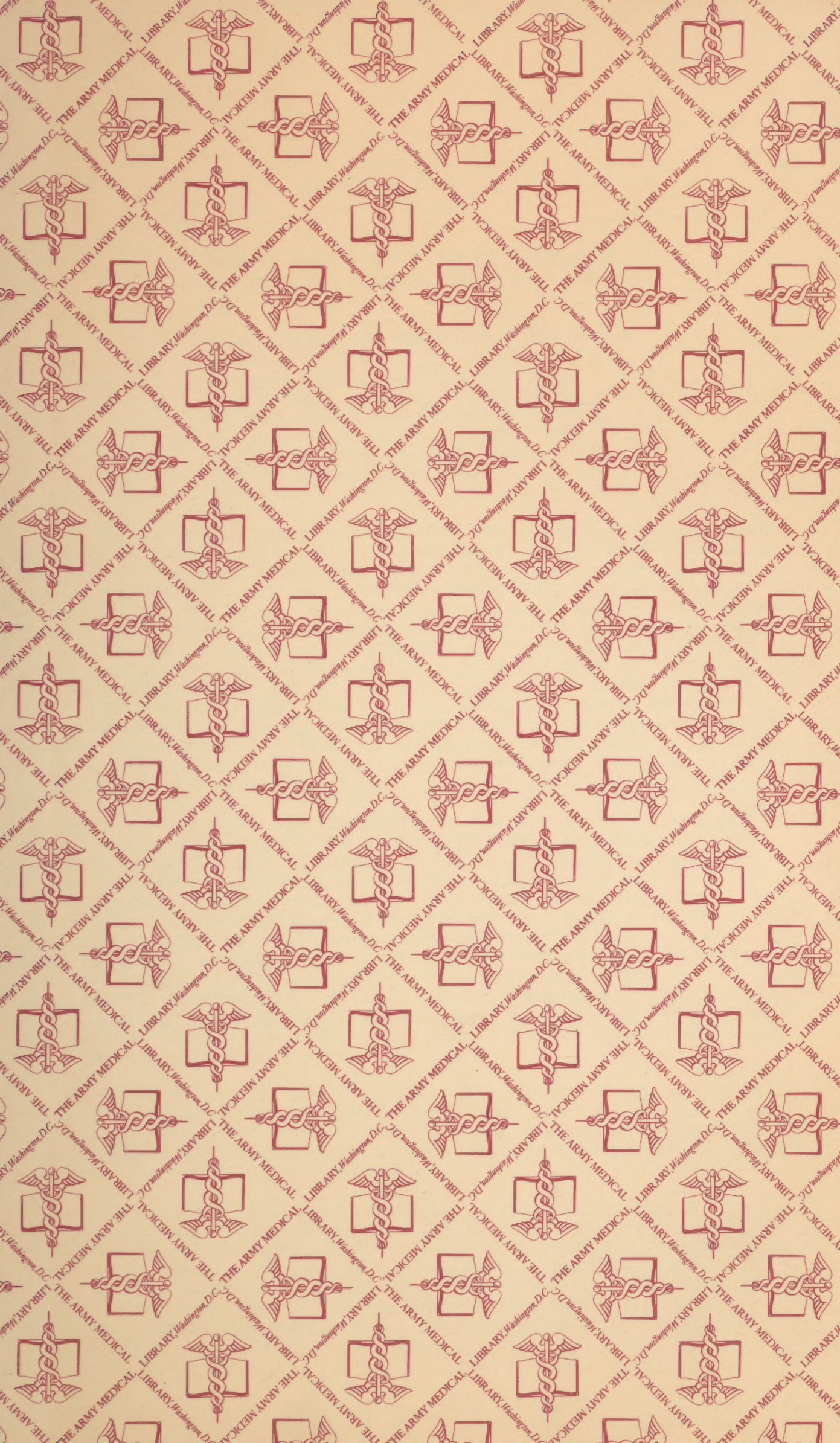
14021380R



NLM 05098247 2

NATIONAL LIBRARY OF MEDICINE











DEPARTMENT OF THE ARMY  
Office of The Surgeon General  
Washington 25, D. C.

27 January 1949

RESEARCH NEEDED IN THE FIELD OF SANITATION  
(With particular attention to civilian war problems)

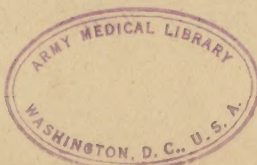
Notes compiled for discussion of the subject  
by Colonel William L. Wilson, Medical Corps,  
Special Assistant to The Surgeon General (Army)  
at 10:00 A. M., Friday, 28 January 1949, before  
The Sanitation Study Section, Division of  
Research Grants and Fellowships, National  
Institutes of Health, U. S. Public Health  
Service, Bethesda, Maryland.

At the outset I apologize for undertaking discussion of so vast a subject before you who are so well-qualified in its many aspects. I risk it because I have sought, from qualified sources, valuable discussions, advice, and help with reference to many problems of sanitation which were observed in Europe during and after the recent war. I yielded to a selfish desire to explore with you problems of sanitation which we may foresee and which might require future solution through an integration of civil with military health administration in the event of war. Certain problems of sanitation produced or exaggerated by circumstances arising from the preparation for, as well as the conduct of, war will be considered rather than attempt a detailed listing of many phases of sanitation research already well-conceived, underway, and adequately understood by you. Perhaps if we could agree upon a system for appraisal of sanitation problems which currently exist in peace but require changed solutions quantitatively and qualitatively in war, the time spent will be justified.

This approach should separate needed sanitation research into two great groups; namely, administrative and technical research. In determining precedence one over the other, my experience would favor administration because we must anticipate solving problems of sanitation in war with what is at hand, by administrative readjustments, far more than by technical developments. We may visualize success only by proper study of potential problems and through sufficient research into both administrative and technical aspects while insuring suitable evaluation and balancing of the findings. This immediately indicates a need for order and sequence, establishing five phases: (1) defining, (2) planning, (3) organizing, (4) testing, and (5) operating and visualizing, respectively (1) clear delineation of problems, (2) establishment of programs, (3) provision of means, (4) evaluation of plans - programs - means, and (5) successful performance of missions.

No one of these needs await completion of the other. If problems of sanitation are considered both from their administrative and technical aspects in approximately that order, while maintaining a continuing consideration of the research required and the results obtained, satisfactory results in war will appear more economically and efficiently.

Definition of the problems can be effective only when undertaken by such groups as this and the National Research Council, which are currently familiar with technical details, and so situated as to remain informed of results of research previously undertaken. An actual listing of specific projects of research needed at any one time will depend upon estimates of the situations that may exist, evaluation of what has been done, and then what needs to be done. For example, it would be a major research project to obtain definitions of:



Encl. 1



U A  
927  
q W 754 n  
1949



1. The nature of the sanitation required for whole populations, classified into categories of physical fitness for civilian and military duties by such factors as age, sex, color, pregnancy, illnesses, war-injured, and any others with particular attention to the insane or others incapable of self-help or self-care.

2. Sanitation criteria which will, by their application, determine the destinations for all population categories when or if displaced or dislodged by war.

3. Criteria which from viewpoint of sanitation:

- a. Compel the holding of populations in place.
- b. Justify permitting populations to remain in place.
- c. Justify permitting populations to move.
- d. Compel removal of populations.

You know what has been done. Perhaps this discussion, and many others of similar nature, will aid in estimating situations and determining what needs to be done. If a few sanitation problems are listed later which may require research, you would have to state and define the problems, then inquire into the administrative and technical aspects under phases of plans, organization, testing, and operations.

The phase of planning is perhaps the most difficult of all, for it has less of precedent than other phase. Effective sanitation planning for civilians in war can result only from an organization logically supporting the planning, when the planning is properly coordinated, and when it can be suitably tested administratively and technically. For war purposes this will be difficult in spite of new heights of success achieved in World War II, and even though all of us continue to work together in closest harmony in an effort to achieve equal or better results for civilians if they were faced with a future war. Our present research in the field of sanitation for civilians in war is not organized according to a uniform plan, nor is it coordinated in a manner which would assure us successful research, either administratively or technically. Furthermore, the problem of budgets can be solved economically and efficiently only by coordinated planning. Here again the administrative problems far exceed technical ones, particularly if one visualizes the planning needed for war administration of sanitation involving personnel, water supply, food and feeding, care of sick and wounded, medical equipment and supplies, transport, communications, evacuations, housing, and many others.

The phase of organization demands activities by which we will have insured:

Classifications, procurement, and allocation of available personnel and materiel means.

Establishment of proper administrative framework.

Proper control and supervision.

Proper communications established.

Prescription of policies and procedures.

Creation of functional units.

The testing phase offers wide fields and opportunities. It challenges scientific approach, by which results from research can be applied in testing effectiveness of personnel, organization, equipment, supplies, techniques, procedures needed, under all foreseeable circumstances which tend to reduce or prevent the necessary sanitation.



1. The nature of the subject is presented in a very general manner, and the reader is left to draw his own conclusions from the facts presented.

2. The subject is presented in a very general manner, and the reader is left to draw his own conclusions from the facts presented.

3. The subject is presented in a very general manner, and the reader is left to draw his own conclusions from the facts presented.

4. The subject is presented in a very general manner, and the reader is left to draw his own conclusions from the facts presented.

5. The subject is presented in a very general manner, and the reader is left to draw his own conclusions from the facts presented.

6. The subject is presented in a very general manner, and the reader is left to draw his own conclusions from the facts presented.

7. The subject is presented in a very general manner, and the reader is left to draw his own conclusions from the facts presented.

8. The subject is presented in a very general manner, and the reader is left to draw his own conclusions from the facts presented.

9. The subject is presented in a very general manner, and the reader is left to draw his own conclusions from the facts presented.

10. The subject is presented in a very general manner, and the reader is left to draw his own conclusions from the facts presented.

11. The subject is presented in a very general manner, and the reader is left to draw his own conclusions from the facts presented.

12. The subject is presented in a very general manner, and the reader is left to draw his own conclusions from the facts presented.



The phase of operations is the culmination of all that has gone before; its success is essential to preservation of the nation, and is dependent upon:

Continuous process.

Utilization of existing facilities and systems.

Simple operational schemes with minimum introduction of new means, techniques, procedures.

Maximum integration of effort on behalf of the nation as a whole, with maximum integration of civilian with military operations.

Proper manning by competent personnel in units which, in war, can be controlled successfully under civil or military administration and can be transferred between such administration in simple and quick manner.

Maximum civil control and civilian performance.

Minimum military supervision or interference.

It is encouraging to note that any research which would improve sanitation in war, would also benefit peacetime sanitation. For that reason there would be less monetary diversion or loss in studying our problems than in many other types of research for war.

All research should assume that we must utilize locally available means to maximum rather than plan upon local storing or importation of large war reserve stocks of expensive materials or items, previously developed and held unused in anticipation of future emergencies. The latter would be prohibitive as well as unrealistic and impracticable.

All research should visualize the wartime sanitation required for human and animal populations:

1. Fixed populations (remaining in place):

a. Undamaged:

- (1) and otherwise unchanged.
- (2) with added populations of good health
- (3) with added populations of good health, but also additional sick, wounded, incompetents.
- (4) without added populations of good health but with added sick, wounded, incompetents.

b. Damaged:

- (1) without added populations.
- (2) with added populations of good health.
- (3) with added populations of good health, but also additional sick, wounded, incompetents.
- (4) without added populations of good health, but added sick, wounded, incompetents.

2. Partially fixed, some of population moving:

a. Priorities, by categories, set for that portion of the population to move or be moved.

b. Priorities for sanitation measures (actual listing) to be implemented:







- (1) for those going
- (2) for those remaining

c. Priorities, by categories, of the portions of the population who are to be employed in effecting necessary sanitation measures, and prescribed:

- (1) from those going
- (2) from those remaining

### 3. Mobile or migrant whole populations:

- a. Priorities, by categories, of population to be moved.
- b. Priorities for sanitation measures (actual listing) to be implemented.
- c. Priorities, by categories, of populations who are to be employed in effecting necessary sanitation measures.

Risking repetition somewhat, the most expensive sanitation research solely for war application should be in the field of administration of sanitation. It would be impossible to insure sufficient means and measures to obtain desirable or even acceptable sanitation in a series of widespread war damages except by administrative readjustments. That may be achieved without extensive allocation of additional total personnel and with reasonable reserve equipment and supplies.

Budgetary limitations must be kept in mind as we estimate means and measures required locally, regionally, nationally, during war. The target status or likelihood of war damage establishes the following order of priority for consideration of research projects, applicable to each where not previously completed:

#### 1. With enemy action or war damage absent:

- a. Maintenance or protection of sanitation for each community according to usual standards.
- b. Minimum levels of sanitation which can be reasonably permitted for each community without excessive risk to health of that community and to other communities.
- c. Priorities which will be specified for cessation, removal, or deprivation of sanitation measures for each community, in their order of discontinuance, when or if made necessary by circumstances of war.

#### 2. With enemy action or war damage present:

##### a. Water:

- (1) For thirst
  - (a) Protection of existing supplies
  - (b) Provision of alternate, potable supplies

##### (2) For cooking or preparation of food

##### (3) For sanitation, in

- (a) Personal cleanliness, including medical care (soap or detergents?)
- (b) Cooking and eating utensils (soap or detergents?)
- (c) Cleansing of abode or surroundings.
- (d) Cleansing of transport







- (c) Sewage as carrier
- (f) Waste as carrier

b. Food and feeding sanitation:

(1) Food in

- (a) Collection
- (b) Storage
- (c) Processing, packaging
- (d) Shipment
- (e) Distribution

(2) Feeding

- (a) Water required
- (b) Food handling
- (c) Preparation
  - 1. Fuel
  - 2. Utensils, cooking
  - 3. Storage, before and after preparation
- (d) Serving
  - 1. Serving utensils
  - 2. Eating and drinking dishes and utensils

(3) Cleansing facilities of

- (a) Containers
- (b) Storage
- (c) Shipping
- (d) Cooking
- (e) Serving
- (f) Eating

(4) Protection against

- (a) Natural elements, climate
- (b) Biological contamination
- (c) Chemical contamination
- (d) Radiological contamination
- (e) Insects
- (f) Rodents

c. Medical care and aid to war wounded:

(1) Medical care

- (a) That usually required without enemy action or war damage
- (b) That added by war (less aid to wounded)
- (c) Dental service

(2) Aid to war wounded

- (a) Rescue
- (b) Medical attendance for injuries of
  - 1. Trauma
  - 2. Heat or cold
  - 3. Radiation







- 4. Chemical origin
- 5. Others

d. Protection from exposure:

- (1) Population, man and animal
- (2) Water, food, clothing, medical supplies, and facilities, shelter, transport, utilities.
- (3) Detection, identification, reporting
- (4) Protection from or removal of agents
  - (a) Physical
  - (b) Biological
  - (c) Chemical
  - (d) Radiological
  - (e) Others, including new, undeveloped

e. Shelter as to:

(1) Condition

- (a) Undamaged
- (b) Damaged

(2) Capacity for

(a) Living

- 1. Rooms, living and sleeping
- 2. Cubage
- 3. Utility by age, sex, family status

(b) Feeding

- 1. Cooking
- 2. Serving

(c) Sanitary facilities

- 1. Cooking, serving, cleansing
- 2. Washing, bathing for people
- 3. Laundering
- 4. Toilet

(3) Physical protection

- (a) Climatic
- (b) Individual and family seclusion

f. Movement as to

(1) Volition

- (a) Voluntary
- (b) Involuntary

(2) War damage

- (a) Present
- (b) Absent

(3) Control







- (a) Administored
- (b) Uncontrolled

(4) Means

(a) Ground

- 1. Afoot
- 2. Nonmotor-animal propelled
- 3. Motor
  - automobile
  - truck
  - ambulance
- 4. Railway cars
  - freight-box, open, flat
  - passenger-coach, sleeper
  - baggage-express
  - hospital-ambulance
  - troop

(b) Water vessels

- 1. Small boat
- 2. Cargo
- 3. Passenger
- 4. Hospital
- 5. Ambulance
- 6. Naval

(c) Air vessels

- 1. Cargo
- 2. Passenger
- 3. Ambulance
- 4. Helicopter

g. Sewage, waste disposal, pollutions. (Attention must be given to the fact that burial may be impossible because of rocky soil, freezing weather, excess volume, or other factors.)

(1) Sewage (excreta disposal) as to

(a) Origin

- 1. Local
- 2. External

(b) Type

- 1. Residential
- 2. Commercial
- 3. Industrial

(c) Population

- 1. Fixed
- 2. Displaced
- 3. Migrant
- 4. Mobile - controlled, uncontrolled







(d) Disposal

1. Permanent
2. Temporary

(e) Means

1. Permanent system
2. Temporary
3. Improvised

(2) Waste disposal as to

(a) Origin

1. Local
2. External

(b) Source

1. Residential
2. Commercial
3. Industrial

(c) Type

1. Garbage
2. Trash
3. Ashes
4. Industrial

Chemical, including smoke, gases, vapors  
Biological  
Radiological  
Others

(3) Pollutions

- (a) Air
- (b) Stream

h. Insect and Rodent Control:

(1) Insects, as to

(a) Objective of control

1. Temporary
2. Permanent

(b) Means for control

1. Personnel
2. Organization
3. Authority
4. Equipment
5. Supplies
6. Testing of effectiveness

(c) Necessity for control

1. Responsibility for determining
2. Authority for determining







(2) Rodent control

Same as for insects

i. Repairs, as to

(1) Nature of repairs

- (a) Temporary
- (b) Permanent

(2) Necessity for repairs

- (a) Responsibility for determining
- (b) Authority for determining.

(3) Means for repairs

- (a) Personnel
- (b) Organization
- (c) Authority
- (d) Equipment
- (e) Supplies
- (f) Testing or inspecting

j. Rehabilitation:

Same as for repairs, but more likely to be on postcombat, long range, directed basis than repairs.

By now it is necessary to recapitulate. The objective is to present a statement of research needed in the field of sanitation; this discussion has narrowed the field to that required for war purposes. There are two fields of activity indicated for the research, administrative and technical. The normal research should be largely technical, and we must assume that it is progressing to limits dictated by budget, means, capacities, and abilities. But for war purposes, by far the greatest proportion of the research should be directed into administrative aspects, utilizing technical developments which are achieved as necessities, in peace as well as war. There are, of course, important exceptions.

Priorities for subjects of research into sanitation for war purposes have been proposed. There will be exceptions here, too. For example, the ordinary priority for research into repairs is far down the list, particularly for technical activity, for operating phase, and for totally mobile populations. But it is evident that the actual repair required to provide potable water not otherwise available transcends every requirement except the furnishing of any kind of water to quench thirst.

Priorities for the time phasing of research have been suggested with a view to attacking currently unsolved problems in order of significance to any nation's security. The order is not necessarily that indicated for usual or normal phasing. Therefore, only those familiar with research completed or anticipated may properly evaluate the sequence in which further research projects should be undertaken. They may do so intelligently only when they know the problems of sanitation which war superimposes upon the normal situations. They must also assess the varied importance applicable to each community, for many communities will be major target areas, many will be minor, occasional, or incidental target areas, many will not be target areas at all. Sanitation problems for all will change. The non-target area may become a receiver for populations from target areas, making necessary increased sanitation measures for the recipient, quantitatively and qualitatively. The necessary sanitation becomes just as complex and difficult also between the two, as movements of populations progress, and all along the route.





Priorities will change before and during the war or combat phase. Therefore, a statement made correctly at one time will be incorrect before solution of the problems have been achieved. Hence, the view developed here that our research must be preponderantly administrative and must be continuously reviewed and revised. The effect of all this is to prove that the technical expert in sanitation, the competent health administrator, and the military expert (by experience as well as training or observation) must jointly and regularly "estimate the situation."

Let us picture certain possibilities, which we all fervently hope will never occur, then determine what should be done. If we could assume a nation pursuing its usual course until suddenly five major metropolitan-industrial centers are subjected to conventional saturation bombing, two such to more modern bombing, and two vital communications centers to either type, we may begin to define our problems. The first necessity is water, in a very few hours too, to drink. A little later water is required also for food preparation and cooking, then for personal hygiene, cleansing of equipment, and so on. What are the problems if the populations remain in place, some move, or all move? How will the water be procured, stored, moved, distributed, made potable, consumed? The next essential is food. What food is required in quantity and quality? What will be its source, how, in what condition, moved by what, how stored, protected, distributed? With no gas, electricity, or other usual means of cooking, no other fuel available, how will it be prepared? There may be insufficient utensils for preparation, and if present insufficient means for their cleansing in the form of water, soap, detergents. Possibly no dishes, cups, glasses, forks or spoons will be available, and if they are they may be uncleared. If we determine to move the people to the food elsewhere, one can visualize the sanitation involved at every move, every point, every minute.

The present state is one of defining the problems. For example, you can determine the research needed in the matter of water, or of food, only by an exhaustive and systematic research into a defining of the problems. A suggestion heard more than once, and from normally clear-thinking individuals, has been to the effect that we should organize civilian units and teams over the country similar to military units; we should put into storage, strategically located, mobile water purification units, mess equipment, food stocks, and so on, to be issued immediately when they become required. It may be seen that all of these would, of necessity, come into the bombed area from outside. If such were possible, what are the sanitation problems? If not, as I believe to be the case except for strategically-stored emergency reserve stocks, what can we do to secure necessary sanitation by local means and measures? I believe the latter is required.

In this field we attempt to collaborate fully with all agencies involved in sanitation for civilians in war. We must do this if we are to achieve proper integration of military and civilian efforts, and keep the control and operations in the hands of civilians, where we believe they belong. The U. S. Public Health Service, Office of Civil Defense Planning, Health Departments, professional societies, schools of engineering, medicine, and public health, all have the major interest and responsibility. To permit orderly effort on our part, The Surgeon General directed a study begun in March 1947 on the problems of integrating administration of civil health affairs with the military. The major objective is our friendly but selfish interest in obtaining maximum civil administration and civilian performance, minimum military responsibility or interference, and no diversion of military energy or means to civilian health affairs.

In conclusion, two matters are presented. One was the necessity for me to insure some order in coverage of the subject discussion; it resulted in a check list for considering the research needed in the field of sanitation for war purposes, for civilians. A copy of the check list is furnished as an appendix for what it may be worth. As is evident, it is not complete, it may not be





adequate for your purposes. However, every square in that list would make one of us recently experienced in civil affairs in Europe think of many problems of sanitation. If each of these could be solved in proper manner and in proper time, sanitation would be reasonably achieved for most of the war damaged populations and communities. The check list must be revised from time to time. It must not be static.

The second matter is acknowledgment of my gratitude and indebtedness to some who have taught me, guided me, and suggested to me problems and solutions of problems in the field of sanitation. Among so many I must express appreciation particularly to Dr. Abel Wollman, Mr. V. M. Ellers, Dean Gordon Fair, Colonel William A. Hardenbergh, Dr. Warren F. Draper, Dr. Anna Bactjer, Mr. C. W. Kruse, Mr. F. B. Elder, Mr. Gordon McCallam, Lt. Colonel F. H. Whitley, Major R. J. Karpen.





Check List for Status of Research in Field of Sanitation (1)  
(Particular Attention to Civilian War Problems)

by  
W. L. Wilson, Colonel, PC, USA  
January 1949

"A" Research Required to Provide for (2)	"B" War Damage or Enemy Action (3)									
	Present					Absent				
	Water	Food	Medical Care	Protection from Exposure	Shelter Move- ment	Sewage and Wastes	Insect and Rodent Control	Repairs	Rehabilitation	
I Field of Activity										
(1) Administrative										
(2) Technical										
II Phase of Activity										
(1) Defining Problem										
(2) Planning										
(3) Organizing										
(4) Testing										
(5) Operating (functioning)										
III Population Involved										
(1) Fixed										
(2) Part-fixed, part- mobile										
(3) All mobile										

NOTES: (1) Prepared for conference of 28 January 1949, Sanitation Study Section, Division of Research Grants and Fellowships, National Institutes of Health, U. S. Public Health Service.  
(2) For expansion of subjects, refer to succeeding pages as indicated in squares; Section "A" lists vertical factors, Section "B" the horizontal factors.  
(3) Arranged from left to right in order of priority for attention, most important on left, last in importance on right.

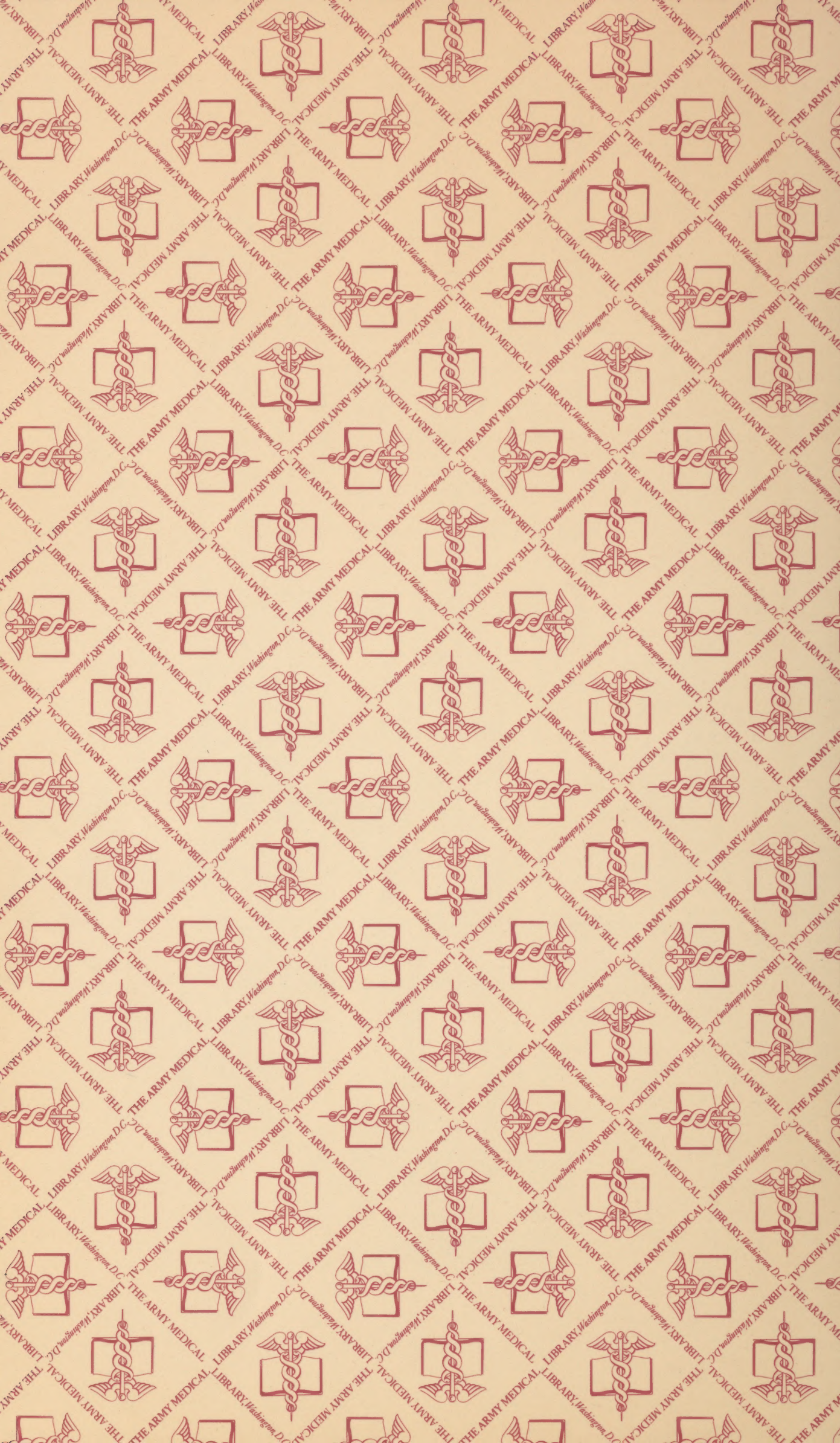


















UA 927 qW754r 1949

14021380R



NLM 05098247 2

NATIONAL LIBRARY OF MEDICINE